

REMARKS:

Applicants express gratitude to the Examiner for the withdrawal of all of rejections in the previous Office Action. Applicants respectfully request reconsideration and withdrawal of the outstanding Office Action rejections based on the foregoing amendments and following remarks. Claims 20, 21, 33, 37, and 38 have been amended. No new matter is added.

Response to Rejections under 35 U.S.C. §103

Claims 16-18, 20-30 and 32 were rejected under 35 U.S.C. §103(a) as being obvious over U.S. 5,288,866 (Strong). The Examiner asserts that Strong discloses a different method of obtaining a pure saponified solution of a pyridine-2,3-dicarboxylic acid ester as shown in Examples 2 and 3. The Examiner acknowledges that Strong differs from the presently claimed method because it involves a bromination step, converting the brominated dicarboxylic acid product into an ether via a nucleophilic reaction using sodium methoxide, a hydrolysis step using NaOH, and an acidification step using H₂SO₄. However, in spite of the clear differences between the method of Astles and the presently claimed method, the Examiner asserts that the present claims do not exclude these steps and therefore the present claims are obvious. Applicants disagree with the proprieties of this rejection for a number of reasons.

Firstly, Applicants submit that the presently claimed method is simply a different method than that of Strong and it is unobvious to modify Strong when there is no suggestion or motivation. Applicants submit that if a cited reference does not include all of the steps which make up the claimed method, it does not anticipate and the Examiner has

the burden of showing how the cited reference renders the claimed steps obvious. Applicants request that the Examiner provide evidence to show how Strong renders the presently claimed method obvious.

The inventive method significantly reduces the number of steps and organic reactions required to obtain a pure final product. The method of Strong requires numerous steps, chemicals (e.g. trimethylamine, 1,3-dibromo-5,5-dimethylhydantion, 2,2-azobisisobutyronitrile, methanol, chlorobenzene, and sodium methoxide) heating, cooling, and drying steps including heating under nitrogen, and finally produces a product with essentially identical purity. Furthermore, the method of Strong requires heating for over 30 minutes, then heating for another 3.5 hours, cooling, drying, stirring overnight, filtering, washing, vacuum drying, heating under reflux for 1 hour under nitrogen, heating again up to 100-105°C, and cooling.

Conversely, the presently claimed method produces a highly pure product with significantly fewer steps (as described in Example 1 on page 12 of the instant application) and only requires a few basic ingredients such as an acid, a base, water, and an oxidizing agent. It would not have been obvious to modify the method of Strong to eliminate most of the steps, chemicals, and reactions, and to instead incorporate the presently claimed steps, e.g. reacting the saponified solution with an amount of an oxidizing agent effective to remove impurities. There is no teaching or suggestion in Strong that the essential steps could be eliminated. Further, there is no disclosure in Strong that would render the presently claimed method obvious.

In industrial practice, the elimination of so many steps and materials will undoubtedly save time and money. The time and materials expense of Strong makes the process

unfeasible for industrial use. Moreover, there is no teaching or suggestion in Strong of reacting the saponified solution with an oxidizing agent. Thus, Applicants submit that the present claims would in no way have been obvious to one of ordinary skill in the art at the time of the invention for at least the above reasons.

Further, with regard to claim 32, there is no disclosure or suggestion in Strong that the pyridine-2,3-dicarboxylic acid is 5-methyl-pyridine-2,3-dicarboxylic acid or 5-ethyl-pyridine-2,3-dicarboxylic acid. Rather, group Z_1 , at position 5 of the pyridine ring is either hydrogen or halogen (see col. 2, lines 1-12 of Strong).

Based on the above reasoning, Applicants submit that claims 16-18, 20-30 and 32 are not rendered obvious by the disclosure of a different process in Strong and the lack of any suggestion of a way to modify the method to arrive at the presently claimed method. Applicants respectfully request that the rejections be withdrawn.

Claims 33-34, 37-47, and 49 have been rejected under 35 U.S.C. §103(a) as being obvious over GB 21192877 (Astles et al.). On pages 4-5 of the Office Action, the Examiner asserts that Astles discloses the process of making herbicidal imidazolinyl compounds by saponification of a solution of a 2,3-dicarboxylic acid ester of formula V, (see lines 35-40, page 4). The Examiner acknowledges that Astles requires bromination, a nucleophilic step, and heating the corresponding dicarboxylic acid anhydride at the reflux temperature. However, in spite of the clear differences between the method of Astles and the presently claimed method, the Examiner asserts that the present claims do not exclude these steps and therefore the present claims are obvious. Applicants submit that if a cited reference does not include all of the steps which make up the claimed method, it does not anticipate

and the Examiner has the burden of showing how the cited reference renders the claimed steps obvious. Applicants request that the Examiner provide evidence to show how Strong renders the presently claimed method obvious.

The Examiner asserts that the final product is prepared by oxidation of the diester precursor with oxidizing agents such as hydrogen peroxide or peracids (see page 4, lines 30-65 and page 5, lines 1-5). Applicants respectfully disagree with the proprieties of the above assertions.

Applicants submit that Astles discloses different process steps which do not include any possible in-situ purification of the intermediates. Astles requires certain synthesis steps which are not in accordance with the presently claimed method. Applicants request that the presented claims be read in view of the specification as a whole, i.e. a method related to in-situ purification. Such a method requires the steps according to the present claims.

Furthermore, in addition to using a different method which requires additional steps which are not essential to the presently claimed method, the process of Astles forms a less pure product than that which is formed with the presently claimed method. The examples of Astles show that the process forms glassy yellow or brown solids and oils and analysis of the products yields less than 98.9% pure products, e.g. Example 1: C:56.3/57.3 = 98.3%, H:6.0/6.3=95.2%, N:11.8/12.5=94.4%. The presently claimed method produces purer products and requires less steps and chemicals than the method of Astles. Moreover, Astles provides no suggestion or motivation to discard a number of steps and to instead adopt a process as presently claimed to arrive at purer products. If such a method was obvious at the time that Astles was published, it would have been used instead of the

process disclosed in Astles to save time, money, and to obtain a purer product. Therefore, Applicants submit that the present claims would not have been obvious to one of ordinary skill in the art at the time of the invention for at least the above reasons.

Based on the above reasoning, Applicants submit that claims 33-34, 37-47, and 49 are not rendered obvious by the disclosure of a different process in Astles and the lack of any suggestion of a way to modify the method to arrive at the presently claimed method. Applicants respectfully request that the rejections be withdrawn.

Claims 1-3, 5-14, 16-18, 20-30, and 32 were rejected under 35 U.S.C. §103(a) as being obvious over GB 21192877 (Astles et al.). On pages 5-7 of the Office Action, the Examiner asserts that Astles discloses saponification of a solution of a 2,3-dicarboxylic acid ester of formula V, (see lines 35-40, page 4). The Examiner acknowledges that Astles discloses the step of converting the 2,3-dicarboxylic acid ester to an herbicidal imidazolinyl compound requires bromination, a nucleophilic step, and heating the corresponding dicarboxylic acid anhydride at the reflux temperature and that none of these steps are required by the instant claims. However, in spite of the clear differences between the method of Astles and the presently claimed method, the Examiner asserts that the present claims do not exclude these steps and therefore the present claims are obvious. Applicants respectfully disagree. Applicants submit that if a cited reference does not include all of the steps which make up the claimed method, it does not anticipate and the Examiner has the burden of showing how the cited reference renders the claimed steps obvious.

Firstly, Astles does not relate to a method for the in-situ removal of impurities from a saponified solution of a pyridine-2,3-dicarboxylic acid ester. Although Astles mentions oxidation of the diester precursor with oxidizing agents such as hydrogen peroxide or peracids (see page 4, lines 30-65 and page 5, lines 1-5), Astles does not disclose or suggest the step of “reacting said saponified solution with an amount of an oxidizing agent effective to remove impurities, thereby providing a purified saponified solution”.

Further, the examples of Astles show that the process forms glassy yellow or brown solids and oils as intermediates and products. The brown oil of Example 6 of Astles is only purified to a colorless oil upon flash chromatography. Thus, Astles does not disclose or suggest in-situ purification of the intermediates. The presently claimed method is related to in-situ removal of impurities from a saponified solution of a pyridine-2,3-dicarboxylic acid ester.

Furthermore, the presently claimed process requires less steps and chemicals than the method of Astles. Moreover, Astles provides no suggestion or motivation to discard a number of steps and to instead adopt a process as presently claimed to arrive at purer products. If such a method was obvious at the time of Astles, it would have been used instead of the process disclosed in Astles to save time, money, and to obtain a purer product. Therefore, Applicants submit that the present claims would not have been obvious to one of ordinary skill in the art at the time of the invention for at least the above reasons.

Based on the above reasoning, Applicants submit that claims 1-3, 5-14, 16-18, 20-30, and 32 are not rendered obvious by the disclosure of a different process in Astles and the lack of any suggestion of a way to modify the method to arrive at the presently claimed method. Applicants respectfully request that the rejections be withdrawn.

Response to Rejections under 35 U.S.C. §112

Claims 20-21 and 37-38 were rejected under 35 U.S.C. §112, second paragraph, as lacking correct antecedent basis in items 11-13 of the Office Action. Applicants submit that claims 20 and 21 have been amended to properly depend from claim 16 and that claims 37 and 38 have been amended to properly depend from claim 33. Applicants submit that these claims are now definite and request that the rejections under §112 be withdrawn.

Claims 33-34, 37-47, and 49 were rejected under 35 U.S.C. §112, second paragraph, as being incomplete for omitting essential steps. The Examiner asserts that the steps of converting the diacid to the herbicidal 2-(2-imidazolin-2-yl)nicotinic acids are omitted in the claims. Applicants submit that claim 33 has been amended to recite the above mentioned step. Support for this amendment can be found on page 11, lines 28-30 of the specification. Applicants submit that the specific steps of various methods for the conversion are known by those in the art as exemplified by the references incorporated on page 11, line 30. The details of the conversion steps are not essential for the invention but can be incorporated if the Examiner requires. Therefore, Applications submit that claim 33 is now definite and in condition for allowance. Claims 34, 37-47, and 49, depending from claim 33, should also be allowable for at least the above reason. Applicants respectfully request that the rejections under §112 be withdrawn.

Conclusion

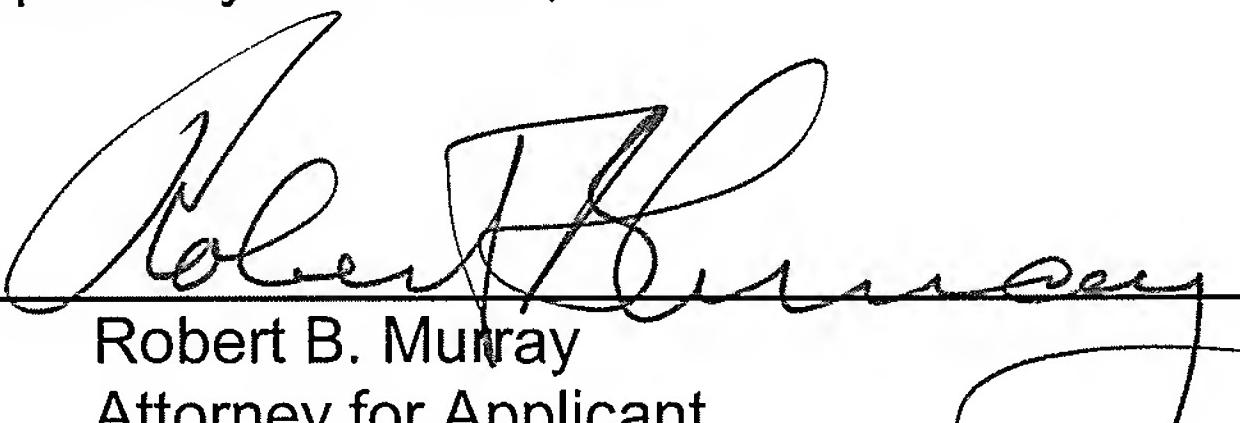
In view of the above remarks and claim amendment, Applicants believe that the rejections set forth in the March 20, 2009 Office Action have been fully overcome and that the present claims fully satisfy the patent statutes. Applicants therefore believe that the application is in condition for allowance.

The Director is authorized to charge any fees or overpayment to Deposit Account No. 02-2135.

The Examiner is invited to telephone the undersigned if it is deemed to expedite allowance of the application. No new matter has been added.

Respectfully submitted,

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